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THE PLANT DISEASE REPORTER

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. These reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

IN THIS ISSUE

George L. McNew reports that tomato blight caused heavy loss in New York this year, page 488.

Abnormal weather in New Jersey favored unusual development of several vegetable diseases this year, according to C. M. Haenseler, page 492.

Corn leaf blight was very prevalent on the susceptible hybrid mostly grown in West Virginia, according to E. J. Wellhausen, page 494.

Tests with Thiosan for the control of dollar spot in Minnesota are reported by Ian W. Tervet, page 495.

J. Lewis Allison and D. W. Chamberlain contribute a list of grass diseases in Wisconsin in 1942, page 496.

The incidence of diseases on red clover in Wisconsin during the past 3 years is reported by J. Lewis Allison, page 498.

Peanut diseases in southern Texas are reported by Glenn KenKnight, page 499.

Brief notes, page 501, include reports on the occurrence of Verticillium on cotton in Oklahoma, by J. Harvey McLaughlin; the discovery of Phytophthora infestans on a solanaceous weed in California, by M. W. Gardner and C. E. Yarwood; and Septoria leaf spot on coltuce in Illinois, by J. A. Stevenson.

Weather of November and of the fall of 1942, page 502.

Check list revision, by Freeman Weiss, page 505.

PHYTOPHTHORA INFESTANS WAS DESTRUCTIVE ON TOMATOES IN NEW YORK STATE DURING 1942

George L. McNew

Some tomato fruit are destroyed in western New York every season by Phytophthora infestans (Mont.) de By. Ordinarily, the disease is not very important since it rarely attacks more than 10 to 20% of the fruit in any one field and very few fields are affected. In 1939 and 1940, serious loss was reported in 2 localities on green wrap tomatoes in cold storage. During 1941, the disease was almost entirely absent since only 1 field of 3 acres was known to be affected. The 1942 season, however, was conducive to the development of a serious epiphytotic on both fruit and foliage of tomatoes throughout the State.

In general, the summer was cool and moist even though actual rainfall, in most areas, was not excessive. There were 2 cool, cloudy periods with intermittent rains late in July. During August, there were (at Geneva) only 2 days in which the temperature exceeded 90°, and only 5 others in which it exceeded 85°F. On the other hand, the temperature dropped below 50° on 4 days and below 60° on 17 days. During the month there were 5 cool, cloudy periods of at least 2-days' duration each, in which there were rainfall and excessive dews: August 1-2 with .42 of an inch of rainfall; August 8-10 with .83; August 13-17 with .77; August 22-24 with .10; and August 28-30 with .26.

This series of favorable infection periods, undoubtedly, set the stage for extensive development of the tomato strain of P. infestans during September. It has been shown[1/] that the fungus from potatoes must be incubated on tomatoes for 6 or 7 sporangial generations before it attains a highly virulent state for the new host. There is little doubt that the fungus acquired its virulence for tomatoes during 1942 because it was very rare on this host during the 1940 and 1941 seasons. The disease was first noticed in 2 fields in Ontario County on August 21 to the extent of about 1%. The first complaint of commercial loss was received on September 2.

After the fungus had attained a virulent state, weather conditions favored its dissemination during September. During the month, there were 21 days in which the temperature dropped below 60°F., of which 13 were below 50° and 5 below 40°. Conditions were favorable for infection during September 3-5 with .09 inch of rainfall; September 8-13 with 3.18; and September 20-28 with 1.41 of an inch. The disease was general and caused severe loss by September 17 but reached its climax in most fields about September 25.

The disease was widely distributed throughout western New York and was reported or observed to cause commercial losses in all of the counties in the tomato-growing belt along Lake Ontario. The disease was most destructive, however, in the area around the northern end of the Finger Lakes in

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1/ Mills, W. R. Phytophthora infestans on tomato. Phytopath. 30: 830-839. 1940.

the counties of Ontario, Seneca, and Cayuga[2/]. Some fields were so severely affected that the crop was never harvested. Canning companies requested that the fruit be left in the field or else the growers found it unprofitable to pick and sort it.

One 20-acre field near Holcomb had an estimated loss of 1.5 tons per acre on 8 acres that were not well air-drained. The vines were 80% defoliated by August 25 and fruit infection to the extent of about 2% developed by September 5. P. infestans was identified on the underside of leaves by microscopic examination of sporangia and sporangiophores. Macrosporium [Alternaria] solani was a contributing cause of defoliation but most of the vine blight was characteristic of that caused by the late blight fungus. The loss in this field, probably, would have been more serious if the disease had not been checked by a thorough application of Bordeaux mixture 4-2-50, late in August.

Tomatoes on 20 acres in the northern part of Seneca County were described by the field man for a canning company as having at least 30% fruit infection on September 2. A conservative estimate of the loss was 3 tons per acre. On another plot of 2 acres, planted on a field seeded to potatoes in 1941, there were fully 6 tons of fruit lost per acre before picking was discontinued prematurely on September 25. In another field of 10 acres, almost half the ripe fruit was infected and the loss placed at about 4 tons per acre for a single picking.

In the Auburn district of Cayuga County, farmers reported the disease present in practically every field and attributed it to poor cultural conditions. By mid-September canning factories in the area reported that tomato pulp had an excessive concentration of mold. Much of the fruit received at the factory was 5 to 15% infected. Losses in the field were 2 to 3 times as severe.

Detailed records were taken in a field near Geneva, planted to the variety, Stokesdale, where 5 copper compounds were being tested on duplicate half-acre plots alongside unprotected plots. Four applications of fungicides were made at 11-day intervals during July and August, using 200 gallons of spray per acre. P. infestans was observed on an occasional tomato on August 25, and on about 2% of the fruit by September 10. The disease reached epiphytotic proportions in the 2 unsprayed plots by September 22. The disease was, therefore, most severe at the time of the heaviest picking since this variety did not ripen until late in the season. About 40% of the fruit had not ripened sufficiently to be harvested.

On September 27, all the fruit on 10 consecutive plants was classified according to maturity and infection. The data presented in Table 1 were taken on adjacent rows at the junction of the plot sprayed with Bordeaux mixture 4-2-50 and the unprotected plots. Groups of 10 plants exactly opposite each other in the 2 plots were examined at 3 points along the

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2/ Professor Charles Chupp has kindly reported his observations to the writer: "This year, the blight seemed most severe along the water ways; the Hudson Valley, Mohawk Valley, Finger Lakes and Great Lakes. Farther inland, there seemed to be less disease." He also volunteers the information that the last severe outbreak occurred during the period 1933-1935. In the Hudson Valley, there were individual fields in which almost 100% of the fruit was destroyed during these years.

plots, which were about 1,200 feet long. Since the plants had made excellent growth, the sprayed and unsprayed plants had overlapped somewhat. It should be remembered, therefore, in judging the data in Table 1 that the unsprayed plants may have received some protection from drifting spray, and the sprayed row examined was, undoubtedly, exposed to more inoculum than other sprayed rows more remote from the control.

Table 1. Loss of marketable fruit on unsprayed Stokesdale tomatoes in a field severely infected with Phytophthora infestans.

Spray plot		Fruit on vines[a]		Amount of ripe fruit[a]				Phytophthora infection	
Fungicide	Sector	Total number	Total weight	Amount ripe	Marketable[b]	Rotted[c]	Phytophthora infected	Ripe	Green
			lb.	%	lb.	lb.	lb.	%	%
Bordeaux	North	1,196	295.0	44.0	97.3	32.5	0.0	0.0	1.7
Bordeaux	Middle	1,389	351.3	26.4	60.2	31.3	0.0	0.0	2.4
Bordeaux	South	1,153	259.2	20.4	27.6	25.2	0.0	0.0	3.9
Bordeaux	Average	1,246	301.8	30.3	61.7	29.7	0.0	0.0	2.7
None	North	1,086	230.1	37.8	25.4	48.4	13.3	15.3	15.7
None	Middle	1,118	246.5	29.5	14.0	34.3	24.3	33.5	32.4
None	South	1,144	236.7	52.5	10.5	79.2	34.7	27.9	67.9
None	Average	1,116	237.8	39.9	16.6	54.0	24.1	25.6	38.7

a/ From 10 consecutive plants in row

b/ Ripe fruit fulfilling requirements of standard U. S. No. 1 and U. S. No. 2 grades.

c/ Fruit with soft rot. Much of this was, undoubtedly, due to P. infestans but symptoms were not conclusive.

The data in column 5 of table 1 show that a higher percentage of the fruit had ripened on the unsprayed plants than on the sprayed ones. This may be attributed either to the exposure of the unsprayed fruit to the sun because the plants were over 60% defoliated, or to the so-called "retarding effect" of Bordeaux mixture. The heavier set of fruit in the sprayed plots and the higher percentage of sound, ripe fruit produced the heavier crop of marketable fruit. There were, on the average, 6.17 pounds of

sound, ripe fruit on each sprayed plant and only 1.66 pounds on the unsprayed ones. This is equivalent (on the basis of 2,904 plants per acre) to yields of 17,918 and 4,821 pounds per acre respectively. The difference between the 2 plots in this one harvest alone amounted to over 6 tons, or 73.1%. At the established contract prices, the monetary loss would be about $110 an acre. These figures agree closely with harvest records on the entire half-acre plots as well as their duplicates, elsewhere, in the field.

From the records presented in Column 8, it is obvious that a loss of 2.41 pounds of ripe fruit per plant can be attributed directly to P. infestans. To this destruction, equivalent to 6,999 pounds per acre, probably should be added about half of the rotted fruit even though positive diagnosis was impossible. The loss of 5.4 pounds of fruit per plant by soft rot in the controls, as compared to 2.97 pounds in the sprayed plants, gives an additional balance of 2.43 pounds (equivalent to 7,057 pounds per acre) in favor of the sprayed plants.

The infection of ripe fruit represented the immediate loss from P. infestans. There would have been even more loss had the remainder of the crop been allowed to ripen because almost 39% of the green fruit were infected. Also, 2.7% of the green fruit on the sprayed plants were infected. The diagnosis of many of these infected green fruit in the sprayed plot was open to question since most of the spots were merely small, subepidermal, light brown discolorations. The infection of the young fruit produced after the last spray application is not surprising, particularly where the plants had fallen across infected vines from the control plot.

Data similar to that of Table 1 were secured by examination of fruit elsewhere in this field. Other sectors of 10 plants each, chosen at random in each of the 12 plots, showed that infection was limited, almost entirely, to unsprayed plants. Six observations in the 2 unsprayed plots revealed 32.5, 38.7, 58.8, 33.9, 63.3, and 37.3% infection of ripe fruit and 31.0, 57.2, 68.0, 33.3, 58.7, and 35.1% infection of green fruit. For those interested in control measures, it can be stated that Copper Oxychloride-sulfate, Tennessee Tribasic copper sulfate, and Copper Compound A were about as effective as Bordeaux, with Yellow Cuprocide only slightly less so.

The fungus and the disease present on the fruit in this field agreed in all respects with the published descriptions 3/, 4/. Infected fruit were placed in a moist atmosphere and after incubation for one week, 25 sporangia from each of 6 fruit were measured. The mean diameters (in microns) were: 35.4 x 17.9; 32.0 x 17.5; 30.8 x 17.9; 33.3 x 17.8; 34.1 x 17.3; and 33.3 x 17.7. These spores were slightly larger than those originally described from potato by De Bary but are quite within the range reported by Siemaszko 5/ for the fungus from tomato. These measurements and the difficulty with which the fungus grew on cultural media leave little doubt as

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3/ Tucker, C. M. Taxonomy of the genus Phytophthora de Bary. Missouri Agr. Exp. Stat. Res. Bull. 153. 1931.

4/ _____ The distribution of the genus Phytophthora. Missouri Agr. Exp. Stat. Res. Bull. 184. 1933.

5/ Siemaszko, W. Notatki fitopatologiczne III. 1. Zgnilizna pomidorow (Phytophthora infestans DeBy. f. sp. lycopersici). Choroby; Szkadnik Roslin, Warsaw 1:43-51 (English summary) 1925. (From Tucker 3/).

to its identity.

Apparently, the fungus was widely dispersed by air-borne conidia in 1942. Some affected fields were adjacent to potatoes (the Stokesdale field, for example) but others were remote from potato fields, and had not been planted to potatoes in recent years. For example, the 20-acre field at Holcomb (page 489) had been in sod for 7 years prior to 1942, and at least 2 other severely infected fields had been completely dissociated from potato culture.

The stage is set for a severe epiphytotic in 1943 if weather conditions are favorable. Now that highly virulent strains of the fungus are widely dispersed in the commercial areas, some of them may survive so that they can attack the crop at a much earlier date and with more serious consequences than in 1942, if cool, moist conditions prevail during August of 1943.

(NEW YORK STATE AGRICULTURAL EXPERIMENT STATION, GENEVA).

1942 VEGETABLE DISEASES IN NEW JERSEY AS AFFECTED BY THE WEATHER

C. M. Haenseler

Every year many plant diseases are affected either adversely or favorably by rainfall, atmospheric humidity, maximum temperatures, degree of fluctuation in temperatures, amount of sunlight, and other factors woven together to make what is commonly called "the weather". In 1940 "the weather" was rather abnormal during the early part of the year, particularly in May, and as a result certain vegetable diseases became much more prevalent and destructive than usual during the spring and early summer of that year. The effect of the abnormal spring weather conditions of 1940 on a number of plant diseases was discussed in the June 1940 issue of PLANT DISEASE NOTES.

The 1942 "weather" also brought about some unusual vegetable disease occurrences which might be worthy of record. This year the "abnormal" period occurred late in the season and consequently the crops, as well as the specific diseases, affected, were quite different from those in 1940. Following are some of the vegetable diseases that were more prevalent or more destructive in 1942 than usual as a result of the seasonal conditions.

Tomato defoliating diseases. It has been many years since the tomato leaf blights (Alternaria [solani] blight, Septoria [lycopersici] blight, and Stemphylium blight) caused such severe defoliation as they did during August and September of this year. Even in sprayed fields that received fungicidal sprays these diseases caused 80 to 95% defoliation as a result of the prolonged period of extremely favorable conditions favoring sporulation of the fungi and infection of the leaves. The difficulty of applying fungicides and of keeping them on the foliage during the long rainy period also greatly favored the fungi. A survey showed that these 3 leaf blights were present simultaneously in most of the fields.

Tomato anthracnose [Colletotrichum phomoides] was also very prevalent in 1942, encouraged no doubt by several seasonal factors. In the first

place climatic conditions were favorable for an earlier start of anthracnose than is usual, thus giving the disease a "running start" on the later pickings. The heavy set of fruit on plants that were weakened by defoliation diseases and the difficulty of getting the fruit picked off before some were over-mature, likewise favored the anthracnose. Anthracnose commonly causes appreciable losses late in the season but this year the weather conditions favored an abnormally long "anthracnose period".

Tomato shoe-string [virus]. In the average season this disease, which causes many or all of the living leaves to become threadlike, was relatively rare, affecting only an individual plant here and there in a few fields. It is often quite prevalent in small home gardens where a wide variety of miscellaneous vegetables are grown, but rarely causes appreciable losses in large fields. This season, we observed several large fields, in which a large percentage of the plants were very severely affected. There are several factors which may have influenced the prevalence of "shoe-string" this year, some of which are associated with the weather. The seasonal conditions doubtless favored the luxuriant growth of certain weeds in which the shoe-string virus overwinters and also may have been unduly favorable for the development of aphids known to carry the disease from the overwintering host plants to the tomato. It may likewise have been influenced by factors other than the weather, such as the planting of a larger acreage of the plum and cherry types of tomato which may be more subject to the disease. Most of the serious shoe-string trouble occurred on the small-fruited varieties of tomatoes this year but it is not known whether this fact is associated with variety susceptibility or with some other factor.

Bacterial blight of Lima bean. The most destructive case of bacterial blight (Bacterium phaseoli) [Xanthomonas] on lima beans that we have ever observed occurred in a field in Hammonton this year. In this case the crop was practically a total loss. Losses were also experienced in other fields in the southern part of the State but no reports were received of total crop destruction outside the Hammonton area. This same disease was very prevalent on snap beans during and following the heavy rains of May 1940 (Plant Disease Notes, May 1940) but in that year the weather "returned to normal" within a relatively short period and consequently the disease ceased to develop before the lima bean crop had reached its stage of greatest danger.

Limas are generally less susceptible to bacterial blight than are snap beans, but in 1942 the "bad weather" apparently occurred just at the time when some of the lima bean fields were in an ideal growth stage for a severe outbreak of the disease.

Infected seed lots no doubt also played an important part in the blight outbreak in limas this year but had it not been for the prolonged period of weather highly favorable for the transmission and development of the organism causing the disease as well as for infection, little damage might have happened to the crop.

Leaf blight of sweet corn(and field corn) caused by Helminthosporium [turcicum] caused more defoliation late in 1942 than we have ever before observed in New Jersey. A few fields of late-planted sweet corn in the more humid South Jersey areas blighted down almost as if a severe frost had killed the leaves. This disease occurs in New Jersey practically every

year but usually the diseased spots are few and largely confined to the older leaves of corn stalks nearing maturity. In such cases the disease may easily be mistaken for leaf death accompanying normal ripening. This season, however, the wet period accompanied by high humidity made conditions so favorable for the disease that young corn was almost totally defoliated in some instances. Such a severe defoliation from the Helminthosporium leaf blight of late sweet corn may not occur again for many years. (From Plant Disease Notes, issued by New Jersey Agricultural Experiment Station, Department of Plant Pathology, Vol. 20, no. 6, Sept. 1942).

LEAF BLIGHT OF CORN IN WEST VIRGINIA

E. J. Wellhausen

Leaf blight primarily due to Helminthosporium turcicum was very severe throughout most of the State this year, perhaps much more severe than in any previous year. Much of the corn acreage is now planted to hybrids; namely, Ohio W-17, Iowa 939, U. S. 65 and U. S. 13. Probably more Ohio W-17 is grown than all the other hybrids put together. Of these, Ohio W-17 is the most susceptible to blight and Iowa 939 the most resistant. Most open-pollinated varieties seemed to be intermediate between Ohio W-17 and Iowa 939 in susceptibility.

Blight was most noticeable in the eastern-panhandle section of West Virginia, primarily in Jefferson and Berkeley counties. It began to appear in this section early in August and spread very rapidly. Its early appearance and rapid spread was probably due to the fact that most of the corn grown in this area was Ohio hybrid W-17. This hybrid is usually fairly ripe by September 1 in this section and much earlier than the later open-pollinated varieties formerly grown or later hybrids that could be grown. It seems that blight does not readily "take hold" until the plants reach a certain stage of maturity. Early hybrids seem to show it first or early plantings often show more blight than late plantings of the same hybrid in the same area.

In general, for the State as a whole blight was most outstanding in the longer-season areas where the tendency has been to grow hybrids a little too early for the region. In the shorter-season areas at the higher altitudes blight was prevalent but much less outstanding. The hybrids that were susceptible when grown at lower elevations often showed relatively little blight at the higher elevations. Again the earlier plantings at the higher altitudes seemed to be the first to show blight, whereas later plantings in the same vicinity often showed little leaf damage. When estimating relative susceptibility of varieties this relationship must be recognized or erroneous conclusions may be reached.

For the state as a whole blight probably caused little or no reduction in yield of grain. It did, however, reduce the value of the fodder considerably. Most of the corn was pretty well along before it was severely hit. Yields of Ohio W-17 and Iowa 939 have been compared throughout the State for the past 5 years. As an average of 36 trials in different areas

of the State prior to this year when blight was not much of a factor, Iowa 939 out-yielded Ohio W-17 by 2.5 bushels per acre. This year with a severe epidemic of blight the resistant hybrid Iowa 939 was compared to Ohio W-17 in 11 different trials throughout the State. The average difference between the 2 hybrids was the same as in previous years; namely, 2.5 bushels per acre in favor of Iowa 939. This does not indicate much damage to Ohio W-17 in grain yields. Even in the eastern-panhandle where blight seemed particularly severe, indications are that it caused no appreciable reduction in grain yields. No direct comparisons between Iowa 939 and Ohio W-17 can be made in the eastern-panhandle section since Iowa 939 was included in only a few trials in this section. However, a direct comparison between Ohio W-17 and U. S. 13, a later hybrid, can be made. Prior to this year U. S. 13 outyielded Ohio W-17 by 24% as an average of 5 trials in Jefferson county. This year with severe blight on Ohio W-17 and only a moderate amount on U. S. 13, the latter outyielded Ohio W-17 by 22% as an average of 5 trials in Jefferson county, indicating no greater difference between these hybrids than in previous years.

Control - Since most of the hybrid corn grown in West Virginia is Ohio W-17 many farmers have obtained the idea that hybrid corn is more susceptible to blight than open-pollinated varieties. This, of course, is not true. Other hybrids equally well adapted to West Virginia and more resistant to blight are recommended. In the long-season areas Ohio W-17 could be replaced by U. S. 13, a later hybrid, intermediate in its resistance to blight and a much higher yielder on most soils. In the shorter-season areas, Iowa 939, a highly resistant hybrid and equally well adapted, could be used. (WEST VIRGINIA AGRICULTURAL EXPERIMENT STATION).

CONTROL OF DOLLAR SPOT IN MINNESOTA

Ian W. Tervet

The unavailability of mercury compounds for the control of diseases of fine turf has led to a search for substitute control measures. During the summer of 1942, dollar spot (Sclerotinia homoeocarpa Bennett) was very severe in Minnesota, the epidemic in general being much heavier than in the past few years. Consequently, greenkeepers were very interested in finding substitutes for the mercuric compounds. In fact several greenkeepers set up experiments, using different fertilizer mixtures including combinations with boron and other minor elements, in an endeavor to control the disease. None of their tests, however, gave any indication that fertilizers could be counted on to give satisfactory control of dollar spot. Limited tests with Sinox (sodium dinitro-orthocresylate) also were negative, as were tests with sulphur dusts and bordeaux mixture. Since only limited and somewhat inadequate tests were made with these compounds, there is still a possibility that some of them may be valuable in limiting dollar spot.

In the summers of 1941 and 1942, extensive tests conducted by several greenkeepers in collaboration with the Minnesota Experiment Station were made with Thiosan (50 per cent tetra-methyl thiuram disulphide) for the control of dollar spot and brown patch (Rhizoctonia solani Kühn). It was

found that Thiosan was excellent in preventing the spread of dollar spot and brown patch, and in protecting the greens from further attacks for 1 to 2 weeks, under conditions favorable for epidemics of these diseases. In the tests the compound was applied at the rate of 1 lb. per 6000 ft. of turf at 2-week intervals, the chemical being applied either as a top dressing with compost as a carrier, or by sprayer. Both methods gave good control in preventing the diseases. Attempts to control dollar spot after it was well established on greens were less successful; in some cases, even when 2 or 3 lbs. of Thiosan were applied to 6000 sq. ft. of turf, no obvious control was obtained, while the standard inorganic mercury (a mixture of mercuric and mercurous chlorides) applied at the rate of 1 lb. per 6000 ft., gave excellent control and quick recovery of the grass.

Reports on the control of dollar spot from greenkeepers in Minnesota who have used Thiosan during 1942, have been conflicting. It was found that some greenkeepers were applying Thiosan in a sand or compost carrier, and then watering the treated area. Under such conditions, where an excessive amount of water was applied, it is apparent that the chemical is less effective. On the other hand, many greenkeepers were satisfied with Thiosan as a fungicide, finding that excellent control of dollar spot and brown patch could be obtained. It appears that Thiosan will be a valuable new compound in controlling dollar spot and brown patch, but care should be taken to follow the manufacturer's recommendations for methods of application.

(DIVISION OF PLANT PATHOLOGY AND BOTANY, UNIVERSITY FARM, ST. PAUL, MINNESOTA).

GRASS DISEASES IN WISCONSIN IN 1942

J. Lewis Allison and D. W. Chamberlain

This report of the occurrence of grass diseases includes a general discussion of the most prevalent diseases as they occurred this season and a short host index listing only those diseases which were not reported in 1941.1/

Weather conditions during the 1942 growing season were favorable for the development and spread of many grass diseases. Kentucky bluegrass (Poa pratensis L.), the dominant pasture grass in Wisconsin, was severely attacked by powdery mildew (Erysiphe graminis DC.) early in the season. In the southwestern part of the State near Richland Center and in the vicinity of Madison, mildew damaged bluegrass in open pastures. Leaf rusts (Puccinia poae-sudeticae (Westend.) Jørstad and P. rubigo-vera (DC.) Wint.) were common on bluegrass, occurring concurrently with mildew, but were more noticeable in nursery plantings than in pastures. Leaf spot (Helminthosporium vagans Drechs.) was abundant on bluegrass both in nurseries and

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1/ Allison, J. Lewis and D. W. Chamberlain. Grass Diseases in Wisconsin in 1941. U. S. Dept. Agr., Bur. Pl. Indus. Pl. Dis. Rptr. 26 (1): 19-22. January 15, 1942.

pastures from mid-summer until late fall. Bluegrass strains[2/] exhibited striking differences in reaction to the above mentioned diseases. Stripe smut (Ustilago striaeformis (Westend.) Niessl) a heretofore relatively uncommon disease of bluegrass in Wisconsin, was found sparingly in several localities in the State and occurred abundantly in the southwestern pasture region around Richland Center. Here every pasture was infected with smut and in many cases damage was extensive. Red top (Agrostis alba L.) was also severely attacked by leaf smut. In one pasture numerous collections of smutted bluegrass plants examined microscopically, yielded chlamydospores of Urocystis agropyri (Preuss) Schröt. This is the first record of Urocystis attacking bluegrass in Wisconsin. All other collections from the same locality proved to be Ustilago striaeformis.

Smooth bromegrass (Bromus inermis Leyss) was attacked by several diseases during the course of the season. Leaf scald (Rhynchosporium secalis (Oud.) Davis) appeared early, was abundant by mid-June, diminished during the summer and reappeared in early fall. Scald caused extensive damage to many nursery progenies. Bacterial spot (Phytomonas coronafaciens (Elliot) Bergey et al. var. atropurpurea (Reddy & Godkin) Magrou) [Pseudomonas] was moderately severe on many nursery progenies during late spring and early summer. Other bromegrass leaf spots (Selenophoma bromigena (Sacc.) Sprague & Johnson), Helminthosporium bromi Died.) and ergot (Claviceps purpurea (Fr.) Tul.) were commonly observed but never became severe. Stagonospora bromi Smith & Ramsb., heretofore not recorded as occurring on bromegrass in Wisconsin, was found to be quite abundant as a leaf spot during September and October.

Several other leaf spots and foliage abnormalities occurred on inbred lines and clonal progenies[2/]. These appeared to be of non-parasitic origin, as in no case was a causal organism successfully isolated. From a grass disease survey made during mid-July in the bromegrass nurseries located at Ames, Iowa and Lincoln, Nebraska, it was apparent that diseases were much more severe at Madison than at either of the other 2 locations.

Sudan grass (Sorghum vulgare Pers. var. sudanense (Piper) Hitchc.) as in 1941, was again host to several diseases. Bacterial spot (Phytomonas andropogoni (E. F. Smith) Bergey et al) [Pseudomonas] appeared soon after seedling emergence and persisted until mid-summer. Although very severe, it alone was not especially destructive. Leaf blight (Helminthosporium turcicum Pass.) and anthracnose (Colletotrichum graminicolum (Ces.) Wilson) did not appear until late summer. They developed very rapidly, damaging field stands, and injuring many nursery progenies.

Inbred lines[2/] of Sudan grass exhibited striking differences in degree of resistance to these 3 diseases. Several "leaf spots" of non-parasitic origin were also observed on inbred lines of Sudan grass.

Diseases on hosts not listed in the 1941 report but commonly observed this season:

Agropyron repens (L.) Beauv.

Bacterial spot --- Phytomonas coronafaciens (Elliot) Bergey et al. var. atropurpurea (Reddy & Godkin) Magrou [Pseudomonas]

Powdery mildew --- Erysiphe graminis DC.

2/ Nurseries of the grass breeding project, Department of Agronomy and Division of Forage Crops and Diseases, Bureau of Plant Industry, U. S. Dept. Agr., cooperating.

Agrostis alba L.
Stripe smut --- Ustilago striaeformis (Westend.) Niessl
Bromus inermis Leyss.
Leaf spot --- Stagonospora bromi Smith & Ramsb.
Bromus marginatus Nees.
Head smut --- Ustilago bullata Berk.
Festuca rubra L.
Ergot --- Claviceps purpurea (Fr.) Tul.
Brown stripe --- Scolecotrichum graminis Fckl.
Stem rust --- Puccinia graminis Pers.
Hordeum jubatum L.
Flag smut --- Urocystis agropyri (Preuss.) Schröt.
Panicum virgatum L.
Leaf spot --- Cercospora fusimaculans Atk.
Poa pratensis L.
Flag smut --- Urocystis agropyri (Preuss.) Schröt.
(COOPERATIVE INVESTIGATIONS OF THE WISCONSIN AGRICULTURAL EXPERIMENT STATION AND THE DIVISION OF FORAGE CROPS AND DISEASES, BUREAU OF PLANT INDUSTRY, U. S. DEPARTMENT OF AGRICULTURE).

RED CLOVER DISEASES IN WISCONSIN IN 1940-41-42

J. Lewis Allison

This report of red clover diseases covers 3 consecutive seasons and describes the variability of the principal diseases from year to year.

Powdery mildew (Erysiphe polygoni DC.), the most common pathogen attacking red clover varieties grown in Wisconsin, was prevalent each year. Mildew was very severe during 1940, relatively light during 1941, and moderatelyly severe in 1942. These differences have been influenced primarily by weather conditions. Abundant cloudy weather and rainfall during July and August of 1940, and a mean temperature of about 70°F., were ideal for second crop clover growth. Mildew developed and spread rapidly on this growth. In 1941, rainfall was below normal and it was hot and dry during July and August. General conditions were poor for either good clover growth or mildew development. During 1942 the total rainfall for July and August was about normal with cloudy weather and low temperatures which served to produce an excellent second crop of clover. A moderate amount of mildew developed.

Northern anthracnose (Kabatiella caulivora (Kirch.) Karak.) caused considerable loss to the first crop of red clover in Wisconsin in 1942. Ordinarily northern anthracnose is spotted in occurrence and limited in its attack. The disease may develop in several small areas in the same field but only occasionally spreads to involve entire fields. This localized type of attack was present in 1940 and 1941. During 1942, however, entire fields throughout Wisconsin were seriously damaged. Northern anthracnose develops best between 60-65°F. under conditions of moderate humidity. The organism cannot withstand extreme periods of heat and drought and rarely attacks the second crop of clover. Much of the inoculum produced during the early part of each season does not survive until fall of

the same season, when reinfection may occur. Fall-infected plants carry the organism through the winter and provide inoculum for the following season. Spores of this organism are disseminated chiefly by free water and the disease does not spread rapidly from the loci of infection under normal field conditions.

During late September of 1941, rainfall was much above normal throughout most of Wisconsin. This provided a rapid regrowth of red clover and widespread fall infection with Kabatiella. As fall infection is less severe than spring infection, it passed relatively unnoticed. This light fall epiphytotic provided the inoculum for spring infection of early clover and, combined with abundant rainfall, cloudy weather and low temperatures, resulted in a general epiphytotic in 1942 compared with the spotted attacks of 1940 and '41.

Leaf spot (Stemphylium sarcinaeforme (Cav.) Wilt.), rust (Uromyces trifolii (Hedw. f.) Lév.) and sooty blotch (Cymadothea trifolii (Pers.) Wolf), ordinarily are considered minor diseases of red clover in Wisconsin but under ideal conditions may develop rapidly during early fall and cause damage. These 3 diseases were destructive during the fall of 1940, occurred sparingly in 1941 causing little damage, and were quite prevalent during the early fall of 1942.

In 1941, as mentioned earlier, there was a drought period during the growing period of the second clover crop. Owing to the weakened condition of clover, a great deal of the black stem disease developed, causing considerable damage. Isolations from blackened stems from many regions of the state showed that the principal organism involved was Phoma trifolii Johnson & Valleau. There were in addition several secondary organisms, attacking as weak parasites, that were responsible for some of the black stem.

Other red clover diseases, leafspot (Cercospora zebrina Pass.) and bacterial spot (Phytomonas trifoliorum Jones et al) [Pseudomonas] occurred each year causing slight damage. Virus diseases have been observed, especially in fields of second-year clover, but have been limited in occurrence and caused little damage. Root rot in second-year fields of red clover has been prevalent on the sandy soils of central Wisconsin. Several species of Fusarium have been isolated from diseased roots and upon reinoculation have been found weakly parasitic. As yet no one organism has been determined definitely as causing all the root rot.

(COOPERATIVE INVESTIGATIONS OF THE WISCONSIN AGRICULTURAL EXPERIMENT STATION AND THE DIVISION OF FORAGE CROPS AND DISEASES, BUREAU OF PLANT INDUSTRY, U. S. DEPARTMENT OF AGRICULTURE).

PEANUT DISEASES IN CERTAIN SOUTH TEXAS COUNTIES IN 1942

Glenn KenKnight

In Wilson County, Texas, the 1942 season was marked by moderate rainfall in April and May with a rather severe drought in June broken by excessive rainfall early in July. Thereafter the weather was favorable to the peanut crop until the hurricane of August 29 to 30, which was followed by excessive rainfall amounting to about 15 inches in 2 weeks in most of the county. Commercial peanuts were all of the Spanish variety. Thrips

injury was conspicuous in all fields during June, although damage did not appear to be great. The injury became inconspicuous during the wet period in July but increased again during August. July rains delayed maturity of the peanut crop, and harvest, which progressed slowly due to shortage of labor, got underway about 2 weeks later than usual with few fields dug before August 5.

Cercospora leaf spot [Cercospora spp.] was most conspicuous in very early and very late peanuts in Wilson County but caused appreciable defoliation in only a few fields. It had been noted in earlier surveys that leaf spot was always most conspicuous in fields that had been planted frequently to peanuts. In the 1942 survey the preceding crop was recorded whenever possible. Of 60 fields surveyed for leaf spot in this county, leaf spot was rare in 26, averaging 2 or fewer lesions per plant. None of these 26 fields were known to have been planted to peanuts in 1941, 4 had been out of cultivation, and 16 had been in crops other than peanuts. Of 18 fields in which leaf lesions averaged from 3 to 50 per plant, 6 were known to have been in peanuts in 1941, 7 in other crops, and 4 undetermined. Of 14 fields averaging 50 or more lesions per plant but without appreciable defoliation, 4 were known to have been in peanuts in 1941 and 1940 or in peanuts frequently, 2 were in other crops in 1941 but in peanuts in 1940, and 2 were undetermined. All 3 of the fields in which leaf spot caused serious defoliation had been in peanuts in 1941 and 2 of them were known to have been planted to peanuts frequently.

In 14 fields in Live Oak County where in most instances peanuts were planted for the first time, and in 9 of 10 fields in Atascosa, Dimmit, and Frio Counties where rainfall had been less than in Wilson County, leaf spot caused no loss. However, near Dilley in Frio County leaf spot was severe on a field that had been planted to peanuts in 1941 and had received more rainfall than the others.

In south Texas, crop rotation may serve as a control measure for peanut leaf spot.

Loss from southern blight [Sclerotium rolfsii] is determinable only in fields where the nuts are mature or nearly so, and consequently was not recorded in all instances. In Wilson County on 16 sandy fields loss from the disease ranged from 8 to 50% with an average of 27%. The disease was not found on any black-land fields. In Live Oak County southern blight was found in only one of 14 fields. That field was sandy land that had been planted to peanuts frequently since 1917. In Atascosa County the disease was found on all 4 fields noted causing an average loss of 29%. All of these fields were sandy soil that had probably been planted to peanuts frequently.

Loss in peanuts from cotton root rot [Phymatotrichum omnivorum] was restricted to the heavier soil, and, because of the greatly expanded peanut acreage in such soil, was more prevalent than usual. The disease was noted on 20 of 60 fields in Wilson County, affecting 5% or less of the plants in 14 fields and up to 35% in the others. Cotton root rot caused much more damage on the heavier soils in Live Oak County where it was found on 11 fields killing up to 83% of the plants with 15% or more killed in 7 fields. No cotton root rot was noted on peanuts in Atascosa and Dimmit Counties, and only a trace in one field in Frio County.

Physiologic chlorosis, apparently due to soil alkalinity, was present on 3 of 60 fields in Wilson County, stunting severely all plants in 2 of the fields. The disease was noted as severe in one field in Live Oak County. A very common type of chlorosis, apparently genetic in origin, was widespread, generally affecting 1 to 2% of the plants to a varying degree.

A virus disease of peanuts, readily transmissible by the carborundum method and causing severe stunting, a rosette appearance, and clearing of the veins in young leaflets, was widespread throughout Wilson, Atascosa, and Frio Counties, although generally only a few plants would be found in any field.

(TEXAS AGRICULTURAL EXPERIMENT STATION, STOCKDALE, TEXAS).

BRIEF NOTES ON PLANT DISEASES

VERTICILLIUM WILT OF COTTON IN OKLAHOMA: Specimens of diseased cotton plants forwarded to this department in late September of 1942 were found to be infected with Verticillium albo-atrum Reinke & Berth. This disease has been previously reported from several of the cotton-producing states, including Oklahoma.

The Verticillium fungus was first isolated from diseased cotton plants received from near Geary, Oklahoma. The plants had been growing in soil with a pH range of 6.0 to 6.5. Examination of this field at a later date showed the disease to be present in small isolated areas of just a few plants. The estimated loss was from 1 to 2%.

A period of 12 to 16 days was required to isolate and identify Verticillium from diseased root tissues. Negative results were obtained when attempts were made to isolate from aerial parts of the diseased plants; however, less than 50% of the root sections plated yielded Verticillium. This difficulty of obtaining positive cultures of the organism has been experienced by other workers, according to recent correspondence.

In October, diseased cotton plants were received from a field near Mangum that were also infected with V. albo-atrum. The collector of this lot of plants reported large areas of leafless, dying plants in the diseased field.

Verticillium wilt of cotton has been reported once before from Oklahoma. (P.D.R. Supp. 86:63. 1933). The occurrence of Verticillium this year may be correlated with the unusual, somewhat excessive amount of precipitation Oklahoma has experienced. The 1942 findings indicate that in the future all collections of Oklahoma-grown cotton plants suspected of being Fusarium-wilted should be subjected to isolation techniques to determine the possibility of Verticillium being present. (J. Harvey McLaughlin, Oklahoma Agricultural Experiment Station, Stillwater, Oklahoma).

PHYTOPHTHORA INFESTANS ON THE WEED SOLANUM SARACHOIDES: On a truck farm near Colma, California, on October 22, 1942, abundant leaf and stem infection of Phytophthora infestans was found on Solanum sarachoides Sendt. localized around scattered volunteer potato plants showing typical late blight infection. As on the potato leaves, there was abundant sporulation of the fungus on the under side near the advancing margin of the large,

irregular, watersoaked leaf lesions on the weeds. The mycelial growth and sporulation of the fungus from the weed when cultured on the freshly cut surface of a healthy potato tuber was typical of P. infestans from potato. This weed, which in California has previously been referred to Solanum villosum L., was identified as S. sarachoides Sendt. by Dr. G. L. Stebbins of the Division of Genetics, who states that it is an introduction from South America. (M. W. Gardner and C. E. Yarwood, Division of Plant Pathology, University of California, Berkeley).

SEPTORIA LEAF SPOT ON CELTUCE IN ILLINOIS: Prof. M. B. Linn of the Department of Horticulture of the Illinois Agricultural Experiment Station, sent a specimen of badly spotted leaves of celtuce, an oriental variety of Lactuca sativa, collected at Glen Ellyn, Illinois. The fungus associated with the spots was Septoria lactucae Pass., a common and widespread parasite of other lettuce varieties, but apparently not heretofore reported on celtuce. (J. A. Stevenson, Division of Mycology and Disease Survey).

WEATHER OF NOVEMBER AND OF THE FALL OF 1942

(From U. S. Department of Commerce, Weekly Weather and Crop Bulletin for week ending December 8, 1942).

The end of November terminated the fall season for the current year. In general, the season was characterized by favorable weather, except for too much rain in some interior, eastern, and far northwestern sections, and rather serious dryness in much of the South, especially the Southeast and far Southwest. Temperatures were decidedly uniform, with averages for each of the last 2 months of the season slightly above normal in practically all sections of the country. September was relatively warm in the more eastern and far Western States, and moderately cooler than normal in intervening areas.

Figure 1 shows that November had slightly below normal temperature in a relatively small northwestern area and also very locally in the Northeast and on the Pacific coast; elsewhere there was somewhat more-than-normal warmth. Figure 2 shows the departures from normal for the fall season (September-November) as a whole. Except in a few limited areas, the averages were somewhat above normal. In fact, recent years have had a remarkable run of near-normal to above-normal fall temperatures. During the last decade not a single fall could be classed as generally cold, for all but one have averaged from practically normal temperature to decidedly above normal rather generally throughout the country; the one exception, that of 1937, had substantially below normal in Eastern States, though abnormally warm in the West.

Figure 3 shows the percentage of normal precipitation, by State averages, for November 1942. November was abnormally wet in a large northwestern area, including northern California, and also from the central Mississippi Valley and Lake Region eastward. This month was abnormally dry in the South, especially the Southwest where very little precipitation occurred; New Mexico had only 3 percent of normal rainfall for the month.

Fig. 1. Departure of Mean Temperature from Normal November, 1942

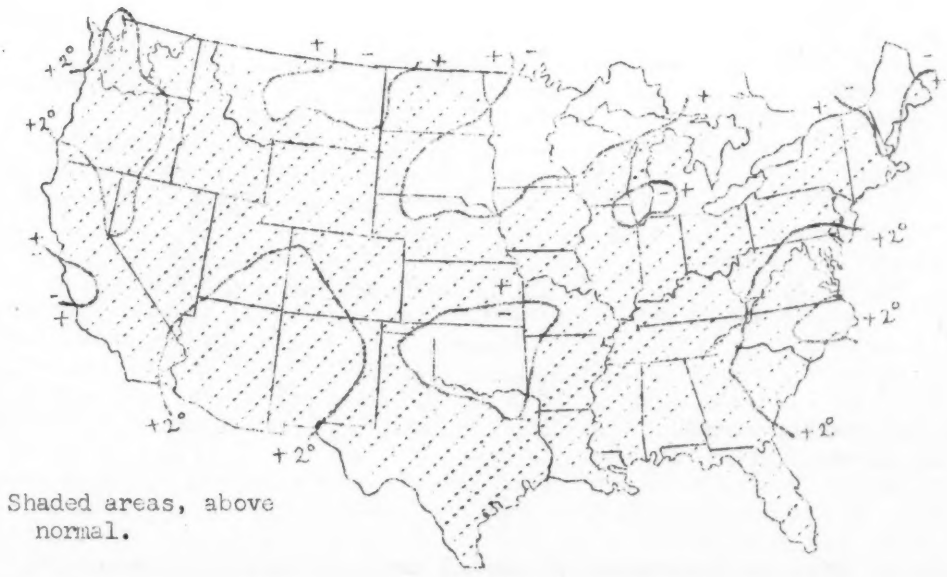

Fig. 2. Departure of Mean Temperature from Normal Sept. - Nov., 1942

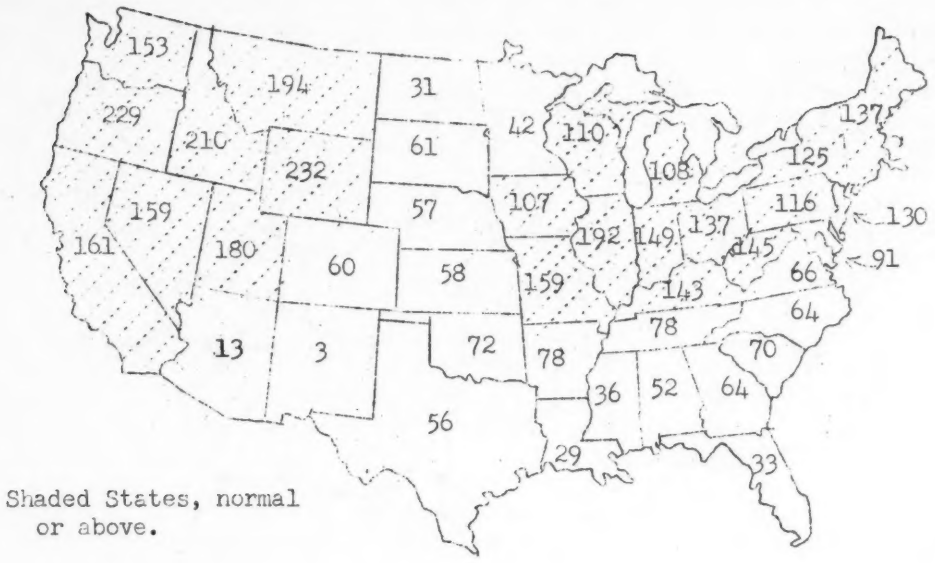

Fig. 3. Percentage of Normal Precipitation by States. November, 1942

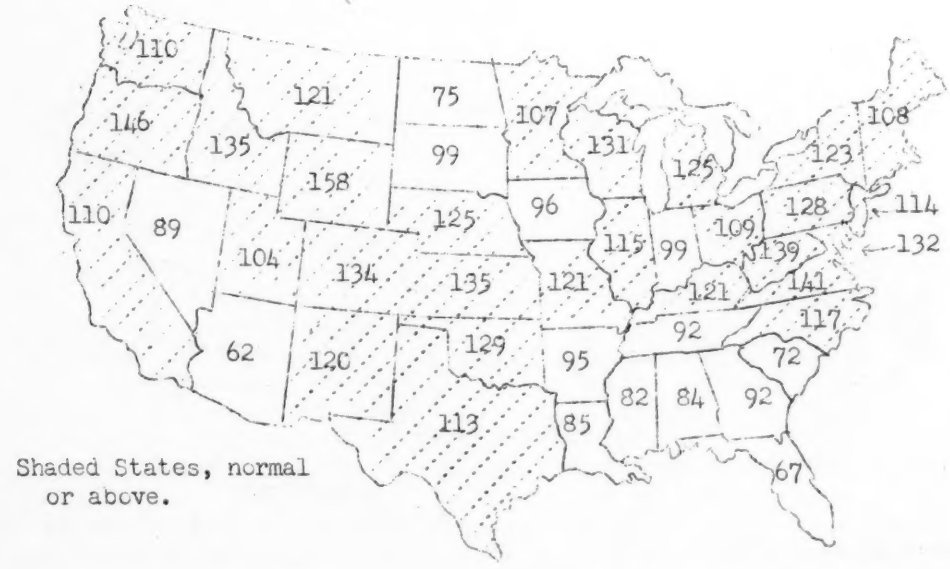

Fig. 4. Percentage of Normal Precipitation by States The Fall (Sept. - Nov.) 1942

For the country as a whole fall is normally the driest season of the year, the United States average precipitation being 6.44 inches. The country-wide average for the fall of 1942 was 7.08 inches or 110 percent of normal.

For the fall season as a whole, Figure 4 shows deficient rainfall in the Southeast, parts of the Southwest, and a limited central-northern area. All other sections of the country had above normal, the excesses being largely in the middle East, Lake region, the far Northwest, Rocky Mountain States, and the southern Plains.

CHECK LIST REVISION

Freeman Weiss

VIBURNUM (CAPRIFOLIACEAE)

VIBURNUM spp. Native shrubs of many kinds and wide distribution in temperate N. America, chiefly of interest as furnishing food for wildlife, some also planted for ornament. Familiar examples: V. ACERIFOLIUM L., MAPLELEAF VIBURNUM, of Growth Regions 23 to 29 incl.; V. ALNIFOLIUM Marsh., HOBBLEBUSH, of G. R.'s 23, 24, 26, 27; V. DENTATUM L., ARROWWOOD, of G. R.'s 22 to 27; V. LANTANA L., WAYFARING TREE, native of Europe but naturalized in Eastern States; V. LENTAGO L., NANNYBERRY, of G. R.'s 13, 15, 18, 21 to 29 incl.; V. TRILOBUM Marsh., CRANBERRY-BUSH, of G. R.'s 4, 12, 15, 18, 21 to 27.

Botryosphaeria ribis (Tode ex Fr.) Gross. & Dug., on branches. Va.
Cercospora varia Pk., leaf spot. Me. to Gulf States, Colo. & Wis.
(C. opuli (Fckl.) Höhn., reported in Ala., Miss. & Iowa, may be the same).
Coleosporium viburni Arth., rust (II, III). Ill., Iowa, Mich., Wis.
C and I unknown.
Corticium stevensii Burt, thread blight. Fla., N. Car.
Cryptosphaeria secreta (Cke. & Ell.) Sacc., on twigs. N. J.
Cryptosporella lentaginis (Ell. & Ev.) Rehm, on twigs. Iowa.
Diaporthe beckhausii Nits., on branches. Mass., N. Y.
D. opuli Wehmeyer. N. Y., N. Dak.
D. viburni Dearn. & Bisby. Iowa, N. J.
Diplodia microspora Berk. & Curt., on twigs. Pa.
Dothiorella peckiana Sacc., on branches. N. Y.
Fomes conchatus (Pers. ex Fr.) Gill., on dead branches. Mo.
Godronia urceolus (Alb. & Schw. ex Fr.) Sacc., on dead branches. Mich.
Haplosporella viburni (Ell. & Dearn.) Petr. (?Physalospora obtusa), on twigs. N. Y.
Hendersonia foliorum Fckl. var. viburni Sacc., leaf spot. Fla., Texas.
Hymenochaete agglutinans Ell., stem-girdle. Pa.

VIBURNUM spp. cont.
Macrophoma hyalina (Berk. & Curt.) Berl. & Vogl., on branches. N. Y. (? Diplodia lantanae Fckl.)
M. viburni Dearn. & House, on branches. Md., N. Y. (Dothiorella viburni (Dearn. & House) Petr.)
Micropeltis viburni Dearn. & House, ? leaf blight. N. Y.
Microsphaera alni DC. ex Wint., powdery mildew. Widespread.
Pezicula minuta Pk., on dead branches. N. Y., Va.
Phyllosticta lantanoidis Pk., leaf spot. N. Y.
P. tinea Sacc. Me., Vt.
P. tineola Sacc. Wis.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Physalospora obtusa (Schw.) Cke., on dead branches. N. Y.
Plasmopara viburni Pk., downy mildew. N. Y. to Ala. and Minn.
Pseudomonas viburni (Thornberry & Anderson) Stapp, leaf spot. Ill.
Puccinia linkii Klotzsch, rust (III). Ida., Mich., Mont., N. H., Wash.
Ramularia viburni Ell. & Ev., leaf spot. Tenn., Wis.
Sphaerographium hystricinum (Ell.) Sacc., and S. lantanoidis Pk., on dead branches. N. Y. The latter is Rhabdospora lantanoidis (Pk.) Jacz.
Verticillium albo-atrum Reinke & Berth., wilt. Ill.

VIBURNUM spp. Exotic flowering shrubs, grown for ornament, especially V. OPULUS L., SNOWBALL, of Europe, cult. Zone III; V. TOMENTOSUM Thunb., JAPANESE S., of E. Asia, cult. Zone IV; V. MACROCEPHALUM Fort., CHINESE S., of China, cult. Zone VI.

Agrobacterium tumefaciens (EFS. & Towns.) Conn, crown gall. Wash.
Botrytis cinerea Pers., shoot blight. Wash.
Cercospora tinea Sacc., leaf spot. La.
C. varia Pk. (? C. opuli (Fckl.) Höhn.). Iowa.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. Fla.
Corticium stevensii Burt, thread blight. N. Car.
Diaporthe opuli Wehmeyer, on branches. N. Dak.
Helminthosporium beaumontii Sacc., leaf spot. Ala., Texas.
Microsphaera alni DC. ex Wint., powdery mildew. Wis.
Phomopsis sp. (? P. beckhausii (Cke.) Trav.), on twigs, ? dieback. Md., N. Y.
Phyllosticta punctata Ell. & Dearn., leaf spot. Iowa, Wis.
Plasmopara viburni Pk., downy mildew. Md.
Pseudomonas viburni (Thornberry & Anderson) Stapp, leaf spot. Ill., Iowa.
Rhabdospora interrupta (Berk. & Curt.) Sacc., on stems. Alaska, Pa.

VIBURNUM TINUS L., LAURESTINUS. Large shrub or small tree of Mediterranean region, grown for ornament, Zone VI.

Cephaleuros virescens Kze., green scurf. Fla., La.
Hendersonia tini Ell. & Langl., leaf spot. La.

VIBURNUM TINUS cont.

Heterodera marioni (Cornu) Goodey, root knot. Calif. Also on V. davidi Franch., Md.
Leptosphaeria tini Ell. & Ev., leaf spot. La.
Plasmopara viburni Pk., downy mildew. Ga.
Verticillium albo-atrum Reinke & Berth., wilt. Oregon.

VITEX (VERBENACEAE)

VITEX AGNUS-CASTUS L., CHASTE-TREE. Shrub of S. Europe, grown for ornament, Zone VI-VII.

Cercospora viticis Ell. & Ev., leaf spot. La., Texas.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.

VITIS (VITACEAE)

VITIS spp., cultivated grapes. (1) Derived from V. VINIFERA L., EUROPEAN WINE GRAPE; commercial cultivation in U. S. restricted almost entirely to California.

Agrobacterium tumefaciens (EFS. & Towns.) Conn, crown gall. Ariz., Calif., Oregon, Wash.
Alternaria sp., fruit rot. Calif.
Armillaria mellea Vahl ex Fr., root rot. Calif., Wash.
Aspergillus niger Tiegh., bunch mold, black mold rot. Calif.
Botrytis cinerea Pers., gray mold rot, shoot blight. Calif., Oregon.
Cercospora vitis (Lév.) Sacc. (C. viticola (Ces.) Sacc.). See Mycosphaerella personata.
Cladosporium sp., green mold rot. Calif.
Cryptosporella viticola Shear, dead-arm, branch necrosis. ? Calif.
Didymosphaeria sarmenti (Cke. & Hark.) Berl. & Vogl., on twigs. Calif.
Diplodia viticola Desm., on canes. N. J.
Elsinoë ampelina (DBy.) Shear (Sphaceloma ampelinum DBy.), anthracnose. Texas.
Eutypella vitis (Schw. ex Fr.) Ell. & Ev., on branches. N. Car., Pa.
(Gloeosporium ampelophagum (Pass.) Sacc.): Elsinoë ampelina.
Glomerella cingulata (Ston.) Spauld. & Schrenk, ripe rot. Texas.
Guignardia bidwellii (Ell.) Viala & Ravaz, black rot. Ala., Mass., Nebr. (One of the principal factors in the failure of European grape culture in the Eastern States).

Heterodera marioni (Cornu) Goodey, root knot. Ala., Calif.
Isariopsis clavispora (Berk. & Curt.) Sacc. See Mycosphaerella personata.
Melanconium fuligineum (Scribner & Viala) Cav., bitter rot. Ga.
Micropera ampelina Sacc. & Fairm., on branches. N. Y.
Mycosphaerella personata Higgins (Cercospora vitis (Lév.) Sacc.), leaf spot. Fla., Ga., La. The conidial stage is also known as Isariopsis clavispora (Berk. & Curt.) Sacc.

VITIS spp. cont.

Nectria viticola Berk. & Curt., on branches. Ala.
Penicillium spp., blue mold rot. Cosmopolitan.
Pestalotia pezizoides de Not., on stems. S. Car.
Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Physopella vitis (Thüm.) Arth., rust (II). Fla., S. Car., P. R.
Plasmopara viticola (Berk. & Curt.) Berl. & de Toni, downy mildew. Calif., Mich., N. Y. (One of the principal factors in the failure of European grape culture in the Eastern States).
Pratylenchus musicola (Cobb) Filip., in roots. Calif.
Sclerotinia sclerotiorum (Lib.) DBy., shoot blight. Calif.
Uncinula necator (Schw.) Burr., powdery mildew. Calif., Md., Idaho, Oregon, Wash.
Black measles ("black mildew") of fruit, - attributed to secondary effects of wood-rotting fungi in the trunk. Calif.
Pierce's disease (Anaheim, California vine, or Emperor disease), - unidentified virus. Calif.
Ring mildew, (fruit blemish), - cause unknown. Calif.
Shot berry, - defective pollination. Calif.
Sulphur dioxide injury (skin blanching, sunken caps), - SO_2 fumigation. Calif.
Water berry, - physiological, possibly excessive bearing. Calif.

VITIS spp., cultivated grapes. (2) Derived chiefly from V. LABRUSCA L., FOXGRAPE, of Growth Regions 22, 23, 24, 25, 26, 27; cult. Zone V; together with other native spp. in some localities.

Agrobacterium tumefaciens (EFS. & Town.) Conn, crown gall. Widespread.
Armillaria mellea Vahl ex Fr., root rot. Ark., Mo., Texas.
Botrytis cinerea Pers., gray mold rot. Cosmopolitan.
Briosia ampelophaga Cav., leaf blotch. Texas.
(Cercospora vitis (Lév.) Sacc.): Mycosphaerella personata.
Clitocybe tabescens (Scop. ex Fr.) Bres., root rot. S. Car. to Texas & Okla.
Coniothyrium diplodiella (Speg.) Sacc., white rot, dieback. Mass. to Fla. & Texas. (Also known as Coniella diplodiella (Speg.) Petr. & Syd.; Metasphaeria diplodiella Berl., said to be its perfect stage, is not reported in this range).
Cryptosporella viticola Shear, dead arm, branch necrosis. Widespread, chiefly in the N.E. States.
Cytospora vitis Mont., on twigs. Kans., Va. See Valsa vitis.
Daldinia concentrica (Bolt. ex Fr.) Ces. & de Not. and D. vernicosa (Schw.) Ces. & de Not., on stumps. Md., Va.
Diaporthe medusaea Nits., on stems. Va.
Diplodia viticola Desm., on twigs. Md., Mich., N. J., Va.
Elsinoë ampelina (DBy.) Shear (Sphaceloma ampelinum DBy.) anthracnose, bird's-eye rot. Widespread.
Endothia gyrosa Schw. ex Fr., on canes. N. Car.
Eutypella vitis (Schw. ex Fr.) Ell. & Ev. (Eutypa viticola Sacc.), on stems. Md., Mich.

VITIS spp. cont.

(Gloeosporium ampelophagum (Pass.) Sacc.): Elsinoë ampelina.

Glomerella cingulata (Ston.) Spauld. & Schrenk, ripe rot. Widespread.

Guignardia bidwellii (Ell.) Viala & Ravaz, black rot of fruit, leaf spot. General.

Haplosporella fabaeformis (Pass. & Thüm.) Petr. & Syd. (Sphaeropsis vitigena Ell. & Ev.), on stems. Kans., Md., N. Y.

Hendersonia sarmentorum Westend., on twigs. N. J., Texas.

Heterodera marioni (Cornu) Goodey, root knot. N. Car.

Hysterographium viticola (Cke. & Pk.) Rehm, on stems. Md., N. J., Va.

(Isariopsis clavispora (Berk. & Curt.) Sacc.): Mycosphaerella personata.

Leptothyrium pomi (Mont. & Fr.) Sacc. (? Microthyriella rubi Petr.), fly speck. Pa., W. Va.

Macrophoma farlowiana (Viala & Sauv.) F. Tassi, on leaves. N. Y.
M. peckiana (Thüm.) Berl. & Vogl., on twigs. N. Y.
M. reniformis (Viala & Ravaz) Cav., on stems. Va.

Melanconium fuligineum (Scribner & Viala) Cav., bitter rot. Widespread.

Mycosphaerella personata Higgins (Cercospora vitis (Lév.) Sacc., Isariopsis clavispora (Berk. & Curt.) Sacc.), leaf spot. Widespread.

Nectria coccinea Pers. ex Fr., on canes following crown gall. Oregon.

Nummularia clypeus (Schw.) Cke., on stems. Ala.

Penicillium spp., blue mold. Cosmopolitan.

Pestalotia spp., fruit rot, leaf and stem spot (secondary). (P. pezizoides de Not., Md., N. J., Va.; P. menezesiana Bres. & Torr., Conn., Fla.; ? P. uvicola Speg., widespread.)

Pezizella oenotherae (Cke. & Ell.) Sacc. Va.

Phoma spp. Of numerous forms reported under this name in association with fruit rot, leaf spot and dieback, P. uvicola Berk. & Curt. (= Guignardia bidwellii) is most frequent; for others see Macrophoma, Haplosporella and Phomopsis.

Phomopsis sp., on stems. Va. See Diaporthe.

Phyllosticta viticola (Berk. & Curt.) Thüm. (P. labruscae Thüm.). Conidial stage of Guignardia bidwellii.

Phymatotrichum omnivorum (Shear) Dug., root rot. Ariz., Nev., Texas.

Physalospora obtusa (Schw.) Cke., on canes. Mass. to Ga. & Mich.

Plasmopara viticola (Berk. & Curt.) Berl. & de Toni, downy mildew. General.

Polyporus spp., wood rot, chiefly of old trunks and stumps, especially P. gilvus Schw. ex Fr., Tenn.; P. hirsutus Wulf. ex Fr., Va.; P. tulipiferus (Schw.) Overh., Va.; P. versicolor L. ex Fr., Ala., Mich., Va., Wis.

Poria spp., wood rot. P. isabellina (Fr.) Overh., Md.; P. papyracea (Schw.) Cke., N. Car., Va.; P. versipora Pers. ex Romell, Mich., Va.; P. viticola (Schw.) Cke., Md., Va.

Pratylenchus pratensis (De Man) Filip., on roots. Calif.

Pyrenochaeta vitis Viala & Sauv. (? Rhytisma vitis Schw.), on leaves. Mass., N. Y., Pa., Texas.

VITIS spp. cont.
Roesleria hypogaea Thüm. & Pass., root rot. N. Y. to Va., Mo., and Iowa.
Rosellinia necatrix (Hartig) Berl., white root rot. Ala., Ind., Mich., N. Y., Ohio.
Schizophyllum commune Fr., wood rot. Va.
Sclerotium bataticola Taub., root rot. Texas.
Septoria ampelina Berk. & Curt., leaf spot. N. Y., Texas, Va.
(Sphaceloma ampelinum DBy.): Elsinoë ampelina.
Sphaeropsis spp., on twigs and canes. See Haplosporella, Macrophoma and Physalospora.
Stereum spp., wood rot. S. purpureum Pers., Fla.; S. umbrinum Berk. & Curt., Va.
Uncinula necator (Schw.) Burr., powdery mildew. General.
Valsa vitis (Schw.) Berk. & Curt., (?Cytospora vitis Mont.), on twigs. Pa.

VITIS AESTIVALIS Michx., SUMMER GRAPE. Growth Regions 22, 23, 24, 25, 27, 28, 29; cult. Zone V.

Alternaria sp., ? leaf spot. Fla.
Diplodia viticola Desm., on stems. Pa.
Elsinoë ampelina (DBy.) Shear, anthracnose. Fla.
Eutypella vitis (Schw. ex Fr.) Ell. & Ev., on stems. Pa., S. Car.
Guignardia bidwellii (Ell.) Viala & Ravaz, black rot. Widespread.
Helminthosporium sp., ? leaf spot. Fla.
Heterodera marioni (Cornu) Goodey, root knot. Calif., Fla.
Macrophoma longispora (Thüm.) Berl. & Vogl., on stems. S. Car.
M. viticola (Cke.) Berl. & Vogl., on leaves. S. Car.
Phoma ampelina (Cke.) Sacc., on stems. Pa.
Phomopsis viticola Sacc., on stems. N. Y.
Phyllachora picea (Berk. & Curt.) Sacc., on stems. N. Y.
Physopella vitis (Thüm.) Arth., rust (II). Fla.
Plasmopara viticola (Berk. & Curt.) Berl. & de Toni, downy mildew. Widespread.
Pyrenochaeta vitis Viala & Sauv., on leaves. Miss., S. Car.
Rhabdospora mueggenburgii Sacc., on stems. La.
Septoria ampelina Berk. & Curt., leaf spot. N. Y., Va.
Uncinula necator (Schw.) Burr., powdery mildew. Widespread.

VITIS BAILEYANA Muns., POSSUM GRAPE. Growth Regions 25, 27, 28, 29. Also V. BERLANDIERI Planch., WINTER GRAPE, of G. R.'s 11, 17, 20, 30.

Coniothyrium berlandieri Viala & Sauv., leaf spot. Texas.
Corticium sp., root rot. Texas.
Heterodera marioni (Cornu) Goodey, root knot. Texas.
Pyrenochaeta vitis Viala & Sauv., on leaves. Texas.

VITIS CALIFORNICA Benth., CALIFORNIA GRAPE. Growth Regions 1, 2, 3, 4, 10, 11. Also V. ARIZONICA Engelm., CANYON GRAPE, of G. R.'s 9, 10, 11, 16, 17.

VITIS CALIFORNICA cont.

Dichomera viticola Cke. & Hark., on dead stems. Calif.
Fusicladium minutulum Sacc., on leaves. Oregon, Wash.
Heterodera marioni (Cornu) Goodey, root knot. Calif.
Mycosphaerella personata Higgins (Cercospora vitis (Lév.) Sacc.), leaf spot. Calif.
Phoma vitis Bon., on stems. Calif.
Phyllosticta spermoides Pk., leaf spot. Calif.
Plasmopara viticola (Berk. & Curt.) Berl. & de Toni, downy mildew. Calif.
Septosporium heterosporum Ell. & Gall. (? Cercospora roesleri (Catt.) Sacc.), leaf spot. Calif.
Uncinula necator Schw. ex Burr., powdery mildew. Calif.

VITIS ROTUNDIFOLIA Michx., MUSCADINE GRAPE. Growth Regions 2C, 22, 25, 28, 29, 30; cult. Zone V. Also V. MUNSONIANA Simpson, BIRD GRAPE, of G. R.'s 30 & 31.

Armillaria mellea Vahl ex Fr., root rot. Fla., Miss., N. Car.
Botryosphaeria ribis (Tode ex Fr.) Gross & Dug., on canes. Fla.
(Cercospora brachypus Ell. & Ev.): Mycosphaerella angulata.
Cryptosporella viticola Shear, canker, dead-arm. Miss., N. & S. Car.
Cryptostictis inaequalis Tehon & Stout, on leaves. Ill.
Eutypella vitis (Schw. ex Fr.) Ell. & Ev. (? E. fraxinicola (Cke. & Pk.) Sacc.), on stems. Ala., Ga., N. Car.
Guignardia sp., muscadine black rot. Ga.
G. bidwellii (Ell.) Viala & Ravaz, black rot. Del. to Gulf States, Mo. & Iowa. (Chiefly a foliage disease on this host; reported under this name but may be a distinct sp. as found in Ga.)
Macrophoma sp., soft rot. Ga.
Melanconium sp. (? M. fuligineum (Scribner & Viala) Cav.), bitter rot. Fla., Ga.
Mycosphaerella angulata Jenkins (Cercospora brachypus Ell. & Ev.), angular leaf spot. Ala., Ga., Va.
Physalospora fusca N. E. Stevens, on stems. S. Car.
P. obtusa (Schw.) Cke. Ala., Ga.
P. rhodina (Berk. & Curt.) Cke. S. Car.
Physopella vitis (Thüm.) Arth., rust (II). Ala., Fla.
Plasmopara viticola (Berk. & Curt.) Berl. & de Toni, downy mildew. (Resistant). Ala., Mich.
Septoria ampelina Berk. & Curt., leaf spot. N. Car., Texas.
Tryblidiella rufula (Spreng. ex Fr.) Sacc., on stems. Fla.

VITIS RUPESTRIS Scheele, SAND GRAPE. Indigenous to Growth Regions 11, 16, 17, 20, 25, 27, 28, 29; cult. Zone V; also V. CINEREA Engelm., SWEET WINTER G., of G. R.'s 11, 17, 20, 22, 23, 25, 29, 30.

Guignardia bidwellii (Ell.) Viala & Ravaz, black rot. Texas, W. Va.
Heterodera marioni (Cornu) Goodey, root knot. Miss.
Mycosphaerella personata Higgins, leaf spot. Kans.

VITIS RUPESTRIS cont.

Phymatotrichum omnivorum (Shear) Dug., root rot. Texas.
Plasmopara viticola (Berk. & Curt.) Berl. & de Toni, downy mildew. Ill., Ind., La.
Uncinula necator Schw. ex Burr., powdery mildew. Ill.

VITIS VULPINA L., FROST GRAPE. Indigenous throughout the Eastern States and Mississippi Valley, and along streams to the Rocky Mts. Some authorities distinguish V. cordifolia Lam. and V. riparia Michx. Used chiefly for rootstocks but has also furnished hort. vars. of table grapes.

Ascochyta ampelina Sacc., on leaves. Wis.
Cercospora vulpina Ell. & Kell., leaf spot. Kans.
Eutypella vitis (Schw. ex Fr.) Ell. & Ev., on stems. N. J.
Gloeodes pomigena (Schw.) Colby, on stems. Ind.
Guignardia bidwellii (Ell.) Viala & Ravaz, black rot. General.
Haplosporella fabaeformis (Pass. & Thüm.) Petr. & Syd., on stems. Kans., Md., N. J., N. Y.
Helminthosporium siliquosum Berk. & Curt., on twigs. S. Car.
Heterodera marioni (Cornu) Goodey, root knot. Calif., Miss.
Hysterographium flexuosum (Schw. ex Fr.) Rehm and H. vulvatum (Schw.) Rehm, on stems. N. Car.
Macrophoma farlowiana (Viala & Sauv.) F. Tassi, on leaves. N. Y.
Mycosphaerella personata Higgins (Cercospora vitis (Lév.) Sacc.), leaf spot. Ga., Ill., La., Mich., Mo.
Myxosporium viticola Dearn. & House, on stems. N. Y.
Pestalotia pezizoides de Not., on stems. Md., Kans., S. Car.
*Phyllosticta spermoides Pk., leaf spot. Ill., Kans., N. Y., Wis. (P. viticola (Berk. & Curt.) Thüm.): Guignardia bidwellii.
Physalospora spp., on canes & branches. P. fusca N. E. Stevens, S. Car.; P. obtusa (Schw.) Cke., Va.
Plasmopara viticola (Berk. & Curt.) Berl. & de Toni, downy mildew. Widespread.
Polyporus versicolor L. ex Fr., wood rot. Nebr.
Pyrenochaeta vitis Viala & Sauv. (? Rhytisma vitis Schw.), on leaves. N. Car., Pa., Texas.
Rhabdospora mueggenburgii Sacc., on stems. La.
Septoria ampelina Berk. & Curt., leaf spot. S. Car., Texas.
S. kellermaniana Thüm. Kans.
Thyridium vitis Ell. & Ev., on stems. Kans.
Uncinula necator (Schw.) Burr., powdery mildew. Widespread.
Valsa vitis Schw. ex Berk. & Curt., on stems. Pa.

(DIVISION OF MYCOLOGY AND DISEASE SURVEY).

*Insert. Pezizella oenotherae (Cke. & Ell.) Sacc. (Sclerotiopsis concava (Desm.) Shear & Dodge), on stems. Va.